

ADVANCES IN ENDOSCOPY

Current Developments in Diagnostic and Therapeutic Endoscopy

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Evaluation of Unexplained Bile Duct Dilatation

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G&H Could you discuss the causes (both common and rare) of dilated bile ducts?

HG Dilated bile ducts are usually caused by an obstruction of the biliary tree, which can be due to stones, tumors (usually of either the papilla of Vater or the pancreas), benign strictures (due to chronic pancreatitis or primary sclerosing cholangitis), benign stenosis of the papilla (ie, papillary stenosis), or a papillary diverticulum. In developing countries, obstruction is commonly caused by parasites that invade the biliary tree.

Less frequent causes of dilated bile ducts include choledochal cysts, which are either congenital or acquired dilatations without obstruction that can be associated with abnormalities of the junction between the pancreatic duct and the bile duct.

G&H Is bile duct dilatation associated with any presenting symptoms or signs?

HG Dilatation alone does not cause symptoms, but if caused by an obstruction, the patients will develop biochemical cholestasis. This can present as jaundice, which can be accompanied by pruritus. The patient will also notice that their urine becomes dark and their stool turns pale. If gallstones are the underlying cause, this is typically associated with pain. Conversely, an obstructing cancer causes painless jaundice. The combination of jaundice, fever, and right upper quadrant abdominal pain is called Charcot triad and indicates ascending cholangitis. This

is a typical complication of bile duct stones and rarely occurs in the setting of bile duct obstruction due to a cancer unless the bile ducts have been instrumented, for example, by endoscopic retrograde cholangiopancreatography (ERCP).

G&H What are the first steps when evaluating a patient with suspected bile duct dilatation?

HG The first step is to determine the degree of suspicion for an underlying obstruction. The suspicion is low in a patient with fairly mild dilatation (based upon the given normal values of the extrahepatic bile duct diameter) in whom there is no associated dilatation of the intrahepatic bile ducts and no biochemical cholestasis. In these cases, the yield of further diagnostic work-up is low. Further evaluation may not be necessary, or it could be reasonable to repeat a conventional transabdominal ultrasound or computed tomography (CT) scan.

On the other hand, the suspicion for underlying obstruction is high in patients with liver function test (LFT) abnormalities and intrahepatic dilatation. Associated symptoms such as pain, fever, or weight loss may increase the degree of suspicion and lower the threshold for further work-up.

The first step would be to obtain cross-sectional imaging (typically a CT scan), followed by noninvasive or minimally invasive modalities such as magnetic resonance cholangiopancreatography (MRCP) or endoscopic ultrasound (EUS). However, if there is a high suspicion that the patient requires therapy (eg, extraction of gallstones or stent placement to relieve jaundice) it would be reasonable to proceed directly with ERCP. The disadvantage of ERCP is the risk for complications, most importantly pancreatitis and postsphincterotomy bleeding. Therefore, we are moving away from using ERCP as a purely diagnostic tool and toward reserving it for cases in which therapy is required. There are also special applications for ERCP such as biliary manometry in patients with suspected sphincter of Oddi dysfunction.

G&H Could you expand on the use of EUS and MRCP for evaluating these patients?

HG If the suspicion of obstruction in a patient is low to intermediate, in most cases, either MRCP or EUS is sufficient to obtain a diagnosis. EUS is invasive in the sense that it requires an endoscopic procedure with sedation, but the complication rate is very low. EUS is accurate for detecting stones and may even be more sensitive than MRCP for detecting small stones. EUS is also superior to other imaging modalities in identifying small neoplasms that cause an obstruction. EUS-guided fine needle aspiration enables a tissue diagnosis with good accuracy. Another application for EUS in this context is to guide biliary drainage procedures. However, it should be noted that the published experience with this application of EUS is limited to small case series and that these EUS-guided interventions are currently limited to use in carefully selected patients.

MRCP, which has been utilized in this setting for some time, is also very sensitive for detecting bile duct stones. In contrast to EUS, MRCP has the advantages of being noninvasive and not requiring sedation.

Beyond these two technologies, cholangioscopy systems are available that allow direct endoscopic visualization of the bile duct lumen and can be used to guide tissue sampling and therapeutic interventions. However, despite recent advances, cholangioscopy plays only a limited role in current clinical practice. Continued refinement and clinical study may broaden the indications for this procedure.

G&H What are the difficulties of evaluating these patients?

HG Marginal dilatation of the bile ducts without cholestasis (ie, without “evidence” of an obstructing cause) can be a common problem in clinical practice. The main difficulty lies in the fact that the normal values of bile duct diameters are not precise figures. There is a significant overlap between pathologic dilatation of the extrahepatic bile ducts and prominent bile ducts without clinical relevance. The diameter of the bile duct is further influenced by the modality and technique with which it is measured. For instance, the normal values of the bile ducts measured on ultrasound are typically a little smaller than the normal values on computed axial tomography scan, which are smaller than the ones measured on ERCP. Measurements on ERCP depend, to a small degree, on the force with which the contrast agent is injected. Furthermore, one has to consider an increase of the diameter with age. For example, on ultrasound, a bile duct diameter of 4 mm can be the normal upper limit

for a 40-year-old patient, whereas 8 mm can be normal for an 80-year-old patient. Other factors that can result in an increase in the bile duct diameter include cholecystectomy and chronic narcotic use. The resulting overlap of normal and abnormal values poses challenges in the differential diagnosis. Although there is typically little or no clinical relevance of a duct dilatation without associated biochemical abnormalities, it can be difficult to rule out an underlying pathologic cause in specific cases.

G&H How is dilatation treated, particularly when the cause is unknown?

HG Treatment is required for symptomatic patients with underlying biliary obstruction. Depending upon the cause, treatment may consist of endoscopic sphincterotomy, stone extraction, surgical cancer resection, or drainage of the bile duct via endoscopic or percutaneous stent placement or surgery. Asymptomatic obstruction only requires relief if there is concern over subsequent development of secondary biliary cirrhosis. As discussed above, the mere diagnosis of a dilated bile duct alone does not require treatment unless a choledochal cyst is suspected. Choledochal cysts have a fairly high risk of progressing into cholangiocarcinoma. However, I would certainly weigh the risk of aggressive surgery very carefully against the risk of cholangiocarcinoma in the untreated patient.

G&H Are there patients in whom the cause of the dilatation cannot be identified?

HG In most cases of bile duct dilatation due to a pathologic condition, it is possible to find the cause. There are some patients in whom the cause of bile duct dilatation remains unclear, but these are typically the patients in whom the dilatation is merely an imaging phenomenon and may not have any clinical relevance. As emphasized above, in the absence of an obstruction, bile duct dilatation has no clinical relevance, with the rare exception of choledochal cysts. In some cases of biliary dilatation and jaundice, an obstructing mass or stricture can be identified, but the exact nature of the stricture cannot be determined. If concern over malignancy is sufficiently high, it may be appropriate to proceed with Whipple surgery even if EUS with biopsies fails to provide a definite diagnosis. In certain cases, it can be appropriate to defer invasive diagnostic work-up altogether and simply proceed to surgery.

In my opinion, we frequently perform an overly extensive diagnostic work-up in patients with a low likelihood of an underlying pathologic condition. This is partially due to the current medicolegal environment.

In cases without LFT abnormalities, often no further work-up is necessary or the patient can simply be followed with a repeat ultrasound. If more intensive work-up is required, as discussed previously, noninvasive or low-invasive tests such as MRCP and EUS should be considered first. ERCP should be reserved for cases that are likely to require endotherapy.

G&H What are the unmet research needs in this area?

HG As discussed, we do not have a very good sense of what is actually normal in terms of the diameter of the bile ducts. It would be helpful to achieve a better understanding of this issue, particularly as it is known that an intensified work-up, for example with EUS, has a low diagnostic yield if biliary dilatation is not associated with LFT abnormalities. Another research need involves sphincter of Oddi dysfunction, particularly type II, in which biliary-type pain is associated with either bile duct dilatation or with LFT abnormalities. There is much controversy regarding the cause and even existence of this diagnosis and how to manage these patients. Further data in the future may clarify some of these controversies. The most exciting development related to biliary disease is the emergence of EUS-guided therapies for obstructed bile

ducts. I am hopeful that further refinement and experience with these techniques will lead to advancements in the future.

Suggested Reading

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